Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1. (Currently amended) A method of determining layer thickness of a particular area of a substrate during CMP of the substrate, the method comprising ~~the steps of~~:

acquiring an image of a particular area of the substrate while the substrate is moving using high speed imaging;

comparing the acquired high speed image to each one of a plurality of stored image patterns; and

converting the acquired high speed image into a layer thickness measurement when the acquired high speed image corresponds to one of said plurality of stored image patterns.

Claim 2. (Currently amended) The method of claim 1, wherein ~~the step of~~ acquiring ~~a high speed~~ an image of a particular area of the substrate includes ~~the steps of~~:

projecting a conventional light source onto the substrate; and

utilizing a high speed camera.

Claim 3. (Currently amended) The method of claim 1, wherein ~~the step of~~ acquiring ~~a high speed~~ an image of a particular area of the substrate includes ~~the steps of~~:

delivering a pulse of light from a coherent light source onto the particular area of the substrate; and

utilizing a conventional camera.

Claim 4. (Original) The method of claim 3, wherein said coherent light source comprises a laser.

Claim 5. (Currently amended) The method of claim 1, wherein ~~the step of~~ acquiring ~~a high speed~~ an image of a particular area of the substrate includes ~~the steps of~~:

delivering a pulse of light from a broad band light source onto the particular area of the substrate; and

utilizing a conventional camera.

Claim 6. (Original) The method of claim 5, wherein said broad band light source comprises a flash lamp.

Claim 7. (Currently amended) The method of claim 1, wherein ~~the step of~~ converting the acquired high speed image into a layer thickness measurement includes ~~the step of~~ converting pixels of the acquired high speed image into layer thickness.

Claim 8. (Original) The method of claim 1, wherein said determination of layer thickness of the substrate is performed in situ.

Claim 9. (Currently amended) An apparatus for determining layer thickness of a particular area of a substrate during CMP of the substrate comprising:

a high speed imager adapted to acquire an image of a particular area of the substrate while the substrate is rotating in situ;

a processing unit in electronic communication with said high speed imager;

a memory device in electronic communication with said processing unit and containing a plurality of instructions which, when executed by said processing unit, causes said processing unit to:

compare the image acquired by said high speed imager to each one of a plurality of ~~stored~~ image patterns stored in said memory device; and

convert the acquired image into a layer thickness measurement when said acquired image corresponds to one of said plurality of image patterns stored in said memory device.

Claim 10. (Original) The apparatus of claim 9, wherein said high speed imager comprises:

a pulsed, coherent light source; and

a conventional camera.

Claim 11. (Original) The apparatus of claim 10, wherein said coherent light source comprises a laser.

Claim 12. (Original) The apparatus of claim 9, wherein said high speed imager comprises:

a conventional light source; and

a high speed camera.

Claim 13. (Original) The apparatus of claim 9, wherein said high speed imager comprises:

a pulsed, broad band light source; and

a conventional camera.

Claim 14. (original) The apparatus of claim 13, wherein said broad band light source comprises a flash lamp.

Claim 15. (Currently amended) A method of determining end-point during CMP of a substrate comprising ~~the steps of~~:

rotating the substrate;

acquiring an image of an area of the rotating substrate using a high speed imager;

comparing the acquired image to stored image patterns; and

converting the acquired image into a layer thickness measurement when the acquired image ~~images~~ corresponds to one of the compared stored image patterns; and

stopping CMP based upon ~~when~~ the layer thickness measurement ~~is a predetermined valued indicating end-point~~.

Claim 16. (Currently amended) The method of claim 15, wherein ~~the step of~~ acquiring an image of an area of the rotating substrate includes ~~the steps of~~:

projecting a conventional light source onto the area of the substrate; and

utilizing a high speed camera.

Claim 17. (Currently amended) The method of claim 15, wherein ~~the step of~~ acquiring an image of an area of the rotating substrate includes ~~the steps of~~:

delivering a pulse of light from a coherent light source onto the area of the substrate; and

utilizing a conventional camera.

Claim 18. (Original) The method of claim 17, wherein said coherent light source comprises a laser.

Claim 19. (Currently amended) The method of claim 15, wherein ~~the step of~~ acquiring an image of an area of the rotating substrate includes ~~the steps of~~:

delivering a pulse of light from a broad band light source onto the area of the substrate; and

utilizing a conventional camera.

Claim 20. (original) The method of claim 19, wherein said broad band light source comprises a flash lamp.

Claim 21. (Currently amended) The method of claim 15, wherein ~~the step of~~ converting the acquired image into a layer thickness measurement when the acquired image corresponds to one of the compared stored image patterns includes ~~the step of~~ converting pixels of the acquired image into a layer thickness measurement.

Claim 22. (Currently amended) The method of claim 15, wherein said acquiring an image of an area of the rotating ~~determination of end-point during CMP of a~~ substrate is performed in situ.

Claim 23. (Currently amended) An apparatus for determining end-point of an area of a substrate during CMP of the substrate comprising:

a high speed imager configured to acquire images of the substrate while the substrate is rotating in situ;

a processing unit in electronic communication with said high speed imager;

a memory device in electronic communication with said processing unit and containing a plurality of instructions which, when executed by said processing unit, causes said processing unit to:

compare images of the substrate acquired ~~acquire~~ by said high speed imager to image patterns stored in said memory device;

convert an acquired image into a layer thickness measurement when said acquired image corresponds to a selected image pattern stored in said memory device; and

stop ~~stopping~~ CMP based upon ~~when~~ the layer thickness measurement ~~equals a predetermined value indicating end-point~~.

Claim 24. (Original) The apparatus of claim 23, wherein said high speed imager comprises:

a pulsed, coherent light source; and

a conventional camera.

Claim 25. (Original) The apparatus of claim 24, wherein said coherent light source comprises a laser.

Claim 26. (Original) The apparatus of claim 23, wherein said high speed imager comprises:

a conventional light source; and

a high speed camera.

Claim 27. (Original) The apparatus of claim 23, wherein said high speed imager comprises:

a pulsed, broad band light source; and

a conventional camera.

Claim 28. (original) The apparatus of claim 27, wherein said broad band light source comprises a flash lamp.